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ARCHIMEDES AND FRANKLIN.



A

LECTURE,

INTRODUCTORY TO A COURSE ON THE

APPLICATION OF SCIENCE TO ART,

DELIVERED BEFORE THE

Massachusetts Charitable Mechanic Association,

7918.74

NOVEMBER 29, 1853.

BY ROBERT C. WINTHROP.



BOSTON:

PRESS OF T. R. MARVIN, 42 CONGRESS STREET.

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BOSTON, DECEMBER 8, 1853.

Hon. ROBERT C. WINTHROP :

Dear Sir,—At a meeting of the Government of the Massachusetts Charitable Mechanic Association, held last evening, the Lecture Committee were instructed to present to you, in behalf of the Association, the thanks of the Board for the eloquent and interesting address delivered by you on the evening of the 29th ult. as the Introductory Lecture to the present course.

They were also further instructed to request a copy for the press, and to make all necessary arrangements for its publication and distribution to the members and the public.

The Committee hope it will suit your convenience to furnish us the manuscript at an early day, in order that it may awaken the public sentiment of our city, to the propriety of erecting a Statue of Franklin in the place of his birth. The force and pertinence with which you urged this measure in your address, will serve to quicken the hearts of our people in its behalf; and its publication no doubt will be followed by that energetic action which will secure the final success of the project.

We remain,

Truly yours, &c.,

F. W. LINCOLN, JR.
FRED. H. STIMPSON,
OSMYN BREWSTER,
JOSEPH M. WIGHTMAN,
ALBERT G. BROWNE,
Committee.

BOSTON, 14 DECEMBER, 1853.

GENTLEMEN :

I am greatly gratified by the proceedings of the Government of the Massachusetts Charitable Mechanic Association, in reference to the Introductory Lecture which I had the honor to deliver before them on the 29th ult.

I cannot hesitate a moment to place my manuscript at their disposal, and I pray you to present to them, and to accept for yourselves, my sincere thanks for the very kind and complimentary terms in which the request was made and communicated.

Believe me, gentlemen,

With true regard,

Your friend and servant,

ROBERT C. WINTHROP.

F. W. LINCOLN, JR.
FRED. H. STIMPSON,
OSMYN BREWSTER,
JOSEPH M. WIGHTMAN,
ALBERT G. BROWNE, *Esquires,*
Committee.

LECTURE.

A CHARMING story which has come down to us in reference to the great orator, philosopher, and patriot of ancient Rome,—and which he has not thought it unworthy to tell briefly of himself, in one of his Tusculan Disputations,—may form a not inappropriate introduction to the Lecture which I am here this evening to deliver.

While Cicero was quæstor in Sicily,—the first public office which he ever held, and the only one to which he was then eligible, being but just thirty years old, (for the Roman laws required for one of the humblest of the great offices of state the very same age which our American Constitution requires for one of the highest,)—he paid a visit to Syracuse, then among the greatest cities of the world.

The magistrates of the city, of course, waited on him at once, to offer their services in showing him the lions of the place, and requested him to specify anything which he would like particularly to see. Doubtless, they supposed that he would ask immediately to be conducted to some one of their magnificent temples, that he might behold and admire those splendid works of art with which,—notwithstanding that Marcellus had made it his glory to carry not a few of them away with him for the decoration of the Imperial City,—Syracuse still abounded, and which soon after tempted the cupidity, and fell a prey to the rapacity, of the infamous Verres.

Or, haply, they may have thought that he would be curious to see and examine the ear of Dionysius, as it was called,—a huge cavern, cut out of the solid rock in the shape of a human ear, two hundred and fifty feet long and eighty feet high, in which that execrable tyrant confined all persons who came within the range of his suspicion,—and which was so ingeniously contrived and constructed, that Dionysius, by applying his own ear to a small hole, where the sounds were collected as upon a tympanum, could catch every syllable that was uttered in the cavern below, and could deal out his proscription and his vengeance accordingly, upon all who might dare to dispute his authority, or to complain of his cruelty.

Or they may have imagined, perhaps, that he would be impatient to visit at once the sacred fountain of Arethusa, and the seat of those Sicilian Muses whom Virgil so soon after invoked in commencing that most inspired of all uninspired compositions, which Pope has so nobly paraphrased in his glowing and glorious Eclogue—the Messiah.

To their great astonishment, however, Cicero's first request was, that they would take him to see the tomb of *Archimedes*. To his own still greater astonishment, as we may well believe, they told him in reply, that they knew nothing about the tomb of Archimedes, and had no idea where it was to be found, and they even positively denied that any such tomb was still remaining among them.

But Cicero understood perfectly well what he was talking about. He remembered the exact description of the tomb. He remembered the very verses which had been inscribed on it. He remembered the sphere and the cylinder which Archimedes had himself requested to have wrought upon it, as the chosen emblems of his eventful life. And the great orator forthwith resolved to make search for it himself.

Accordingly, he rambled out into the place of their ancient sepulchres, and, after a careful investigation, he came at last to a spot overgrown with shrubs and bushes, where presently he descried the top of a small column just rising above the branches. Upon this little column the sphere and the cylinder were at length found carved, the inscription was painfully decyphered, and the tomb of Archimedes stood revealed to the reverent homage of the illustrious Roman quæstor.

This was in the year 76 before the birth of our Saviour. Archimedes died about the year 212 before Christ. One hundred and thirty-six years, only, had thus elapsed since the death of this celebrated person, before his tombstone was buried up beneath briars and brambles, and before the place and even the existence of it were forgotten, by the magistrates of the very city, of which he was so long the proudest ornament in peace, and the most effective defender in war.

What a lesson to human pride, what a commentary on human gratitude, was here! It is an incident almost precisely like that which the admirable and venerable Dr. Watts imagined or imitated, as the topic of one of his most striking and familiar Lyrics:—

“Theron, amongst his travels, found
 A broken statue on the ground;
 And searching onward as he went,
 He trac’d a ruin’d monument.
 Mould, moss, and shades had overgrown
 The sculpture of the crumbling stone,
 Yet ere he pass’d, with much ado,
 He guess’d, and spell’d out, Sci-pi-o.
 ‘Enough,’ he cried; ‘I’ll drudge no more
 In turning the dull stoics o’er;
 * * * * *
 * * * * *
 For when I feel my virtue fail,
 And my ambitious thoughts prevail,
 I’ll take a turn among the tombs,
 And see whereto all glory comes.’”

I do not learn, however, that Cicero was cured of his eager vanity and his insatiate love of fame by this 'turn' among the Syracusan tombs. He was then only just at the threshold of his proud career, and he went back to pursue it to its bloody end, with unabated zeal, and with an ambition only extinguishable with his life.

And after all, how richly, how surpassingly, was this local ingratitude and neglect made up to the memory of Archimedes himself, by the opportunity which it afforded to the greatest orator of the greatest Empire of antiquity, to signalize his appreciation and his admiration of that wonderful genius, by going out personally into the ancient graveyards of Syracuse, and with the robes of office in their newest gloss around him, to search for his tomb and to do honor to his ashes! The greatest orator of Imperial Rome anticipating the part of Old Mortality upon the gravestone of the great mathematician and mechanic of antiquity! This, surely, is a picture for mechanics in all ages to contemplate, with a proud satisfaction and delight.

In opening a Course of Lectures on the application of Science to Art, under the auspices of the Massachusetts Charitable Mechanic Association, I have thought that, instead of any vague generalities upon matters and things which they understand already as well and better than I do, a brief notice of that great mathematical and mechanical Genius, at whose grave Cicero thought it no scorn to do homage, and who may be taken, in some sort, as the very personification of the idea of *Science applied to Art*, would not be uninteresting or unwelcome.

You have adopted Archimedes, Mr. President, as your Patron Saint. You have emblazoned his form on your certificate of honorary membership, as I have had the most agreeable opportunity of knowing. Yet it would not be surprising if, to some of those before me at this

moment, the details of his story were hardly more familiar than they seem to have been to the people of Syracuse, when Cicero visited them nineteen hundred and twenty-nine years ago,—and as they certainly were to myself, I may add, before I entered on the preparation of this Lecture.

Let me then inquire, for a moment, who this Archimedes was, and what was his title to be thus remembered and revered, not merely by the illustrious orator of the Augustan era, but by the American mechanics of the nineteenth century. And in doing this, I may perhaps find occasion to compare his character and his services with those of some one or more of the great inventors and mechanics of our own day and of our own land.

Archimedes was born in the year 287 before the Christian era, in the island of Sicily and city of Syracuse. Of his childhood and early education we know absolutely nothing, and nothing of his family, save that he is stated to have been one of the poor relations of King Hiero, who came to the throne when Archimedes was quite a young man, and of whose royal patronage he more than repaid whatever measure he may have enjoyed. He is stated, also, to have traveled into Egypt in his youth, and to have been a pupil of Conon, a celebrated Samian astronomer, whose compliment to Berenice, the Queen of Ptolemy Euergetes, will not be in danger of being forgotten, as long as the sparkling constellation to which he gave the name of *Coma Berenices*, in honor of her golden locks, shall still be seen glittering in our evening sky. I know not what other lady has secured so lofty a renown, until, indeed, the accomplished Maria Mitchell, of Nantucket, wrote her own name upon the golden locks of a comet, discovered by her in 1847.

Neither royal patronage, however, nor the most learned and accomplished tutors of Egypt or of Greece, could have made Archimedes what he was. His was undoubt-

edly one of those great original minds, which seem to owe little to anybody but their Creator; which come into existence ready trained and furnished for some mighty manifestation, and to which the accidents of life and of condition supply nothing but occasions and opportunities. Pallas springing full-armed from the brain of Jove, is the fabulous and familiar prototype of a class of persons, whose powers and whose productions can be attributed to nothing but a divine genius, and of whom Homer, and Socrates, and Shakspeare, and Sir Isaac Newton,—upon whose statue at Cambridge, in Old England, may be seen the proud inscription, that he surpassed the human race in intellectual power,—will everywhere suggest themselves as examples.

To this order of minds, Archimedes unquestionably belonged. He has been well called, by a French philosopher, “The Homer of Geometry.” It has been said of him by those entitled to pronounce such a judgment, that his theory of the lever was the foundation of statics till the discovery of the composition of forces in the time of Sir Isaac Newton; that no essential addition was made to the principles of the equilibrium of fluids and floating bodies, established by him, in his treatise “*De Insidentibus*,” till the publication of Stevins’s researches on the pressure of fluids in 1608;* and again, “that he is one of the few men whose writings form a standard epoch in the history of the progress of knowledge,” and that no further advance was made in the theory of mechanics after his death, until the days of Galileo, who lived eighteen hundred years later.

You will all agree with me, I doubt not, that the man over whose theories and calculations eighteen centuries may fairly be said to have rolled, without obliterating their record, or even impairing their value and their

* Smith’s Dictionary of Greek and Roman Biography.

importance, may well be numbered among the fixed stars of Science.

It is a striking fact, that Galileo himself, who may well-nigh be included in the same order of intellects, and who was the first to make any advance or improvement in the condition of science after this long interval,—prepared himself for pursuing his own great discoveries by perusing the writings of Archimedes. It was while studying the hydrostatical treatise of the old Syracusan philosopher, that he first conceived the idea of writing an essay on a kindred topic. It was that essay, in illustration of some of the discoveries of Archimedes, which gained for Galileo the favor of a patron, (Guido Ubaldi, the brother-in-law of Cardinal del Monte,) to whom he afterwards owed most of his worldly success.

Would that this high priest of the stars, as he has well been denominated, could have caught a little more seasonably something of the noble courage of the brave old Syracusan! Would that, when summoned before the Inquisition “for thinking in astronomy otherwise than the Franciscan and Dominican licensers thought,”—instead of making an ignominious and humiliating abjuration, he might have been seen boldly asserting to their teeth, those eternal truths which had been revealed to him; and accepting, if so it must have been, that crown of martyrdom, which would have come to him “plaited with immortal laurels!”* I know of no scene in history more derogatory to the character of poor human nature, or more derogatory to the dignity of science, than that of Galileo on his knees before the Inquisitors, recanting that great doctrine of the motion of the earth around the sun which it was his glory to have established; and the sublime exclamation which he is related to have made in a whisper, to a friend at his elbow, as he rose from his

* Sir David Brewster's *Martyrs of Science*.

knees, "*It does move, notwithstanding,*"—only adds a deeper shade to our sense of his humiliation.

We shall have abundant evidence, that he did not derive this unworthy spirit of submission from a study of the life of Archimedes. He might rather be supposed to have caught the idea, that such a stooping to arbitrary power was not inconsistent with the beauty and nobleness of his general character,—from the example of that leaning tower of Pisa, upon whose summit Galileo is known to have stood, in performing some of his experiments and in taking not a few of his observations, and whose unaccountable deflection from a plumb-line seems to have attracted more admiration in some quarters even than the beauty of its proportions or the purity of its material.

It would be tedious and unprofitable to attempt any detailed account, on such an occasion as this, of the writings of Archimedes. He left many works of a scientific character,—treatises on the quadrature of the parabola, on equilibrium and the centres of gravity, on spirals and spheroids and conoids, on the possibility of numbering even the sands on the seashore,—a treatise in which he is said to have anticipated the modern method of logarithms,—and particularly on the sphere and cylinder, his discovery of the precise ratios of which to each other, he evidently regarded as the master-work of his life, when he selected these emblems for that forgotten tombstone which Cicero searched for and found.

All these writings, however, were in the cause of pure, abstract, unapplied science; and had his labors ended here, his name would have had little claim to the reverence of a Mechanic Association, and his character and career would have had still less interest for a general audience. It was by the application of science to art,—it was by the conversion of the results of his profound investigations and marvelous inventions to the direct

advantage of his fellow-men, and to the immediate advancement of his country's welfare, that he earned his chief title to be remembered with admiration and gratitude by the great mass of mankind.

It must be acknowledged, however, at the outset, that there is too much reason for supposing, that most of what he did in this way was prompted by but little feeling of personal respect for anything of practical art, and by but little original impulse of philanthropy. He lived at a day when it was not thought quite consistent with the dignity of a philosopher to busy himself with any of the common affairs or common interests of society. Plutarch tells us, that "the first that turned their thoughts to *Mechanics*, a branch of knowledge which came afterwards to be so much admired, were Eudoxus and Archytas, who thus gave a variety and an agreeable turn to Geometry, and confirmed certain problems by sensible experiments and the use of instruments, which could not be demonstrated in the way of theorem." "But," he adds, "when Plato inveighed against them with great indignation, as corrupting and debasing the excellence of Geometry, by making her descend from incorporeal and intellectual to corporeal and sensible things, and by thus obliging her to make use of matter, which requires much manual labor and is the object of servile trades, then *Mechanics* were separated from Geometry, and being a long time despised by the philosophers, were considered only as a branch of the military art."

In another place, in speaking of some of the great machines which Archimedes invented, he says,—“Yet Archimedes had such a depth of understanding, such a dignity of sentiment, and so copious a fund of mathematical knowledge, that though in the invention of these machines he gained the reputation of a man endowed with divine rather than human knowledge, yet he did not

vouchsafe to leave behind him any account of them in writing. For he considered all attention to *Mechanics*, and every art that ministers to common uses, as mean and sordid, and placed his whole delight in those intellectual speculations, which, without any relation to the necessities of life, have an intrinsic excellence arising from truth and demonstration only."

The old Greek biographer, indeed, seems disposed even to apologize for the great Geometrician, by representing him, in his mechanical inventions, as yielding reluctantly to the importunity of his royal relative. "He did not think the inventing of them (says he) an object worthy of his serious studies, but only reckoned them among the amusements of Geometry. Nor had he gone so far, but at the pressing instance of King Hiero, who entreated him to turn his art from abstracted notions to matters of sense, and to make his reasonings more intelligible to the generality of mankind by applying them to the uses of common life."

Thus, according to Plutarch's account, it is King Hiero, who deserves the credit of having originally prompted that "application of Science to Art," which is to be the subject of your Lectures, and which is the great secret and source of the wonderful inventions and improvements of modern times. And a brave and noble fellow this Hiero certainly was,—Hiero the Second, King of Syracuse,—who, during a reign of more than half a century, devoted himself to promoting the arts of peace, adorning the city over which he reigned with numberless works of public utility as well as of great magnificence, while he ruled his people with an almost republican simplicity, and with much of the substance, and not a few of the forms, of a free constitutional government.

A modern commentator on the character of Archimedes* seems to think that Plutarch "confounded the

* Professor Donkin of Oxford.

application of geometry to mechanics with the solution of geometrical problems by mechanical means," and that he is mistaken in representing Archimedes as despising all mechanical contrivances and practical inventions. I would gladly believe that this is a true theory, but I confess to a good deal of distrust for these corrections of history eighteen hundred years after it was written, and in regard to points, too, upon which no new facts or new testimony have been, or can be, procured.

But whatever may have been the circumstances under which Archimedes originally turned his mind and his hand to mechanical inventions, and in whatever estimation he may himself have held the practical arts and sciences, the noble use to which he afterwards applied them, no less than the wonderful effects which he afterwards produced with them, will be enough to secure him an everlasting remembrance among men.

There is no more characteristic anecdote of this great philosopher, than that relating to his detection of a fraud in the composition of the royal crown. Nothing, certainly, could more vividly illustrate the ingenuity, the enthusiasm, and the complete concentration and abstraction of mind with which he pursued whatever problem was proposed to him.

King Hiero, or his son Gelon, it seems, had given out a certain amount of gold to be made into a crown, and the workman to whom it had been intrusted, had at last brought back a crown of corresponding weight. But a suspicion arose that it had been alloyed with silver, and Archimedes was applied to by the King, either to disprove or to verify the allegation. The great problem, of course, was to ascertain the precise bulk of the crown in its existing form; for gold being so much heavier than silver, it is obvious that if the weight had been in any degree made up by the substitution of silver, the bulk would be proportionately increased. Now it happened that Archim-

edes went to take a bath, while this problem was exercising his mind, and, on approaching the bath-tub, he found it full to the very brim. It instantly occurred to him, that a quantity of water of the same bulk with his own body must be displaced before his body could be immersed. Accordingly, he plunged in; and while the process of displacement was going on, and the water was running out, the idea suggested itself to him, that by putting a lump of gold of the exact weight of the crown into a vessel full of water, and then measuring the water which was displaced by it, and by afterwards putting the crown itself into the same vessel after it had again been filled, and then measuring the water which this, too, should have displaced, the difference in their respective bulks, however minute, would be at once detected, and the fraud exposed. "As soon as he had hit upon this method of detection, (we are told,) he did not wait a moment, but jumped joyfully out of the bath, and running naked towards his own house, called out with a loud voice that he had found what he had sought. For, as he run, he called out in Greek, 'Eureka, Eureka.'"

No wonder that this veteran Geometer, rushing through the thronged and splendid streets of Syracuse, naked as a pair of his own compasses, and making the welkin ring with his triumphant shouts,—no wonder that he should have rendered the phrase, if not the guise, in which he announced his success, familiar to all the world, and that "Eureka, Eureka," should thus have become the proverbial ejaculation of successful invention and discovery in all ages and in all languages from that day to this!

The solution of this problem is supposed to have led the old philosopher not merely into this ecstatic exhibition of himself, but into that entire line of hydrostatical investigation and experiment, which afterwards secured him such lasting renown. And thus the accidents of a

defective crown and an overflowing bath-tub, gave occasion to some of the most remarkable demonstrations of ancient science.

At the instigation and under the auspices of this same King Hiero, Archimedes achieved another of his memorable triumphs, in the building of a ship of wonderful dimensions, far exceeding anything which had ever before been constructed; and which, if the accounts of its magnitude and its magnificence,—of its banqueting rooms, and galleries, and stables,—its baths, its fish-ponds, its temple of Venus, and its floors inlaid with scenes from Homer's Iliad,—be not greatly exaggerated, must have been a perfect floating city of itself, and must have been more than a match, in splendor and in size, if not in speed, even for the Great Republic of our worthy friend and fellow-citizen, Donald McKay.*

One might imagine that it was from the accounts which have come down to us of this marvelous vessel, that Shakspeare,—who, though he is said to have “had small Latin and less Greek,” yet always contrived to pick up whatever either Greek or Latin authors contained which could serve his turn and adorn his story or his style,—must have derived the idea of that gorgeous bark in which he represents Cleopatra—the serpent of old Nile—sailing down the Cydnus to make captive of the valiant but voluptuous Anthony :

“The barge she sat in, like a burnished throne,
Burned on the water; the poop was beaten gold;
Purple the sails, and so perfumed, that
The winds were love-sick with them; the oars were silver,
Which to the tune of flutes kept stroke.”

* While this Lecture is going through the press, the telegraph informs us that the Great Republic has been burned to the water's edge at New York. Every one will sympathize with Donald McKay in this sad disappointment, and will deeply regret that so noble a specimen of naval architecture should have met with so untimely a fate.

It seems to have been discovered too late, however, that Sicily had no harbor large enough for the permanent accommodation of this stupendous structure,—although Syracuse itself was famous for its capacious port, in which, even as late as the year 1798, ages after it had been supposed to be irrecoverably choked up with sand, the heroic Nelson, on his way to the glories of the Nile, found a safe and ample anchorage for a whole fleet of British frigates and ships of war,—watering his ships, in the meantime, at the fountain of Arethusa, and writing to a friend that *that alone* was an ample recipe for victory. At any rate, on this account or some other, this huge vessel was sent off as a present to Ptolemy, King of Egypt, laden with corn enough to supply almost the whole demand of an immediate national scarcity. Now, one of the Ptolemies is said to have had a ship (280 cubits) 420 feet long, and (48 cubits) 72 feet deep, which is nearly 100 feet longer and 35 feet deeper than the Great Republic, and which required four thousand four hundred rowers and other mariners, and was capable of accommodating three thousand soldiers besides—a ship which the great historian Gibbon, in one of his notes, quotes Dr. Arbuthnot as having estimated at four and a half times the tonnage of an English hundred-gun ship! If the ship which Archimedes built was larger and more capacious still, as, under the circumstances, must be presumed, he may fairly be set down as having outdone even the foremost and most adventurous of our East Boston shipbuilders, in the construction of these monsters of the deep; notwithstanding the recent suggestion that Donald McKay can be nothing less than a lineal descendant of the great Ark-builder, father Noah himself.

It must be remembered, however, that there was no ocean navigation in those days to try the strength of her hull, or test the stiffness of her ribs, and that rowing her across the Mediterranean was a very different thing

from giving her to the breeze upon the broad Atlantic. Even for the short voyages of that day, the charming Roman Lyric tells us that there was no great confidence to be placed in these painted and ornamented ships; and I imagine there is very little doubt which of the two vessels any of us would prefer for a voyage to Canton or San Francisco, or even for a trip to Dover. It must not be forgotten, either, that the Sicilian ship did not obey the magic voice of its master builder, as the Great Republic did in the sight of us all in her late majestic and sublime descent into her destined element, with all her bravery on and streamers waving;—but required, we are told, the aid of a powerful and ponderous screw, which Archimedes was obliged to invent, and did invent, for the express purpose of launching her.

But this was not the only screw which Archimedes invented. You are all acquainted with another which bears his name to this day, which, I believe, is often called the water-snail,—and which is sometimes said to have been originally contrived for pumping water out of the hold of this same gigantic ship, and by others as having been invented by him, while in Egypt, for raising the waters of the Nile to irrigate the lands which were above the reach of the river.

It would occupy too much of my time to enter into any detailed account or enumeration of all the inventions which are ascribed to this wonderful man. Nothing seems to have been above or below the reach of his inventive faculties, from a Chinese puzzle to exercise the ingenuity of children, to an orrery illustrating the movements of the heavenly orbs. Nothing seems to have been too difficult for his accomplishment, from an hydraulic organ,—producing music, I dare say, almost as delightful in that day, as can be drawn by any of the fair fingers

before me from one of your President's* grand piano fortes in this,—to that amazing combination of ropes and wheels and pulleys, by means of which, with a slight motion of his hand at the end of a machine which he had contrived for the purpose, he is said to have drawn towards himself, from a considerable distance and upon the dry land, one of the largest of the King's galleys, fully manned and fully laden, in as smooth and gentle a manner as if she had been under sail upon the sea!

It was this last achievement which induced the astonished Hiero to intercede with the philosopher to prepare for him a number of engines and machines which might be used either for attack or defence in case of a siege. Hiero, it seems, thus early adopted the prudent maxim of our own Washington, "In peace, prepare for war." Like Washington, however, he maintained always a pacific and paternal policy, and he finished a reign of almost unequalled duration, without having been obliged to resort to the marvelous enginery with which Archimedes was prevailed upon to provide him.

But the time at length came round, when Syracuse was to need that enginery; and fortunately the old engineer was himself alive and at hand, to superintend and direct its application.

Old Hiero died at ninety years of age, after a reign of fifty-four years. He had made peace with the Romans and become their ally, soon after his accession, and he resolutely adhered to them until his death. His son Gelon had died before him, and he was, therefore, succeeded on the throne by his grandson, Hieronymus, a boy of fifteen years of age, who was flattered and seduced by the emissaries of Hannibal into an alliance

* A few days only after the delivery of this Lecture, the excellent President of the Association, JONAS CHICKERING, Esq., was struck down by apoplexy and died. The remembrance of his virtues and his charities will be long and gratefully cherished by our whole community.

with the Carthaginians. He was soon after basely assassinated by a band of conspirators in the Roman interest, and with him the whole race of Hiero was exterminated. A reaction in favor of the Carthaginian alliance having been the natural consequence of this atrocious massacre, Syracuse at once became a prey to foreign influences and entanglements, and suffered all the evils of a city divided against itself. A Roman fleet was accordingly despatched to turn the scale between the contending factions, and Marcellus was sent over to Sicily to assume the supreme command. But the recent cruelty and barbarity of Marcellus in scourging and beheading, in cold blood, two thousand of the Roman deserters at the siege of Leontini, had roused up all the friends of Rome in Syracuse against him, and they absolutely refused to acknowledge his authority, or even to admit him into the city.

Thence arose that last and most famous siege of Syracuse,—a siege carried on both by land and sea,—Marcellus commanding the fleet, and Appius Claudius the army. The Roman army was large and powerful, invincible and irresistible, as it was supposed, by any force which Syracuse could furnish, whether Carthaginian or Sicilian. It was flushed, too, by recent victory, being fresh from storming the walls of Leontini, which it had accomplished as easily—(to borrow Dr. Arnold's Homeric comparison)—“as easily as a child tramples out the towers and castles which he has scratched upon the sand of the sea-shore.”

“But at Syracuse, (continues this admirable historian and excellent man, whose description could not be mended,) it was checked by an artillery such as the Romans had never encountered before, and which, had Hannibal possessed it, would long since have enabled him to bring the war to a triumphant issue. An old man of seventy-four, a relation and friend of King Hiero, long

known as one of the ablest astronomers and mathematicians of his age, now proved that his science was no less practical than deep; and amid all the crimes and violence of contending factions, he alone won the pure glory of defending his country successfully against a foreign enemy. This old man was Archimedes.

“Many years before, he had contrived the engines which were now used so effectively. Marcellus brought up his ships against the sea-wall of Achradina, and endeavored by a constant discharge of stones and arrows to clear the walls of their defenders, so that his men might apply their ladders, and mount to the assault. These ladders rested on two ships lashed together, broadside to broadside, and worked as one by their outside oars; and when the two ships were brought close up under the wall, one end of the ladder was raised by ropes passing through blocks affixed to the two mastheads of the two vessels, and was then let go, till it rested on the top of the wall. But Archimedes had supplied the ramparts with an artillery so powerful that it overwhelmed the Romans before they could get within the range which their missiles could reach; and when they came closer, they found all the lower part of the wall was loopholed; and their men were struck down with fatal aim by an enemy they could not see, and who shot his arrows in perfect security. If they still persevered and attempted to fix their ladders, on a sudden they saw long poles thrust out from the top of the wall like the arms of a giant; and enormous stones, or huge masses of lead, were dropped upon them, by which their ladders were crushed to pieces, and their ships were almost sunk. At other times, machines like cranes, or such as are used at the turnpikes in Germany, and in the market gardens round London, to draw water, were thrust out over the wall; and the end of the lever, with an iron grapple affixed to it, was lowered upon the Roman ships. As soon as the grapple had taken hold,

the other end of the lever was lowered by heavy weights, and the ship raised out of water, till it was made almost to stand upon its stern; then the grapple was suddenly let go, and the ship dropped into the sea with a violence which either upset it or filled it with water. With equal power was the assault on the landside repelled; and the Roman soldiers, bold as they were, were so daunted by these strange and irresistible devices, that if they saw so much as a rope or a stick hanging or projecting from the wall, they would turn about and run away, crying, 'that Archimedes was going to set one of his engines at work against them.' Their attempts, indeed, were a mere amusement to the enemy, till Marcellus in despair put a stop to his attacks; and it was resolved merely to blockade the town, and to wait for the effect of *famine* upon the crowded population within."*

Plutarch represents Marcellus, in this strait, as laughing outright at his own artillerymen and engineers, and as exclaiming, "Why do we not leave off contending with this mathematical Briareus, who, sitting on the shore, and acting as it were but in jest, has shamefully baffled our naval assault; and in striking us with such a multitude of bolts at once, exceeds even the hundred-handed giants in the fable?" And, in truth, (adds the old Greek biographer,) all the rest of the Syracusans were no more than the body in the batteries of Archimedes, while he himself was the informing soul. All other weapons lay idle and unemployed; his were the only offensive and defensive arms of the city.

That, Mr. President, was the application of science to art with a witness to it, and in the noblest of all causes, the defence of one's country. That was an illustration of the *one man power* which has never been surpassed, if ever equaled, since the world began. I know of few

* Arnold's History of Rome, vol. iii. chap. 45.

things, certainly, more sublime, in the history of human actions, than the spectacle of this old patriot mathematician and mechanic holding Marcellus and the Roman power at bay by his single arm, and saving his native city so long by his unaided and overwhelming genius. It reminds one of nothing so much as of Milton's magnificent description of the heroic, renowned, irresistible Samson, as he calls him in the *Agonistes*, who

“Ran on embattled armies clad in iron ;
 And, weaponless himself,
 Made arms ridiculous, useless the forgery
 Of brazen shield and spear, the hammered cuirass,
 Chalibean-tempered steel, and frock of mail
 Adamantean proof.
 But safest he who stood aloof,
 When insupportably his foot advanced,
 In scorn of their proud arms and warlike tools,
 Spurned them to death by troops. The bold Ascalonite
 Fled from his lion ramp ; old warriors turned
 Their plated backs under his heel ;
 Or, groveling, soiled their crested helmets in the dust.”

Samson's, however, you all remember, was mere physical strength, mere brute force, which, though it could defy a thousand swords and spears, yielded ingloriously at last to a single pair of scissors ; while that of Archimedes was the surpassing and almost superhuman power of intellect, overcoming all physical forces, and rendering them subservient and tributary to its own mighty will.

And now, who can remember this incomparable service which Archimedes rendered to his native city in the hour of its utmost peril, and then reflect upon the oblivion into which his tomb and almost his name seem so soon to have fallen,—even among the magistrates of Syracuse in Cicero's time,—without recalling that touching lesson upon human vanity and human ingratitude which has been left us by the Royal Preacher on the pages of Holy Writ ? One would almost imagine that Solomon was a

prophet, as well as a preacher and a poet, and was permitted to look forward, through the mist of eight centuries, to the very scene we have been witnessing :

“There was a little city, (says he,) and few men within it; and there came a great King against it, and besieged it, and built great bulwarks against it :

“Now there was found in it a poor wise man, and he by his wisdom delivered the city; yet no man remembered that same poor man.

“Then, said I, wisdom is better than strength; wisdom is better than weapons of war; nevertheless the poor man’s wisdom is despised, and his words are not heard.”

There is some confusion of dates in this part of Sicilian and Roman history; but it is calculated that a full year, at the very least, and perhaps two or even three years, elapsed, before Marcellus succeeded in overcoming the countless expedients of Archimedes, and in getting Syracuse into his possession. Among other marvelous means which the old philosopher is said to have employed to avert this catastrophe, was a combination of mirrors in the nature of burning glasses, by which ships were set on fire at the distance of a bowshot from the walls. Some doubt has been thrown upon this story, and it has given occasion to a great deal of philosophical experiment and controversy. The celebrated naturalist, Buffon, however, has abundantly proved that there was nothing impossible about it, having himself succeeded in “igniting wood at a distance of one hundred and fifty feet by means of a combination of one hundred and forty-eight plane mirrors,” and having, according to another account, by a combination of four hundred small mirrors, melted lead at the distance of one hundred and twenty feet, and set fire to a haystack at a much greater distance. And, after all, the account is not a whit more incredible at first view, than the recent experiment of Professor Faraday, who succeeded in igniting gunpowder, by rays of the sun, transmitted

through a lens of Wenham ice. Our friend, Sir Charles Lyell, is particular in telling us that it was *Wenham* ice which ignited the British gunpowder, and that British ice had too much salt, and too many bubbles in it, for a successful experiment.

Syracuse was at last taken, and amid the general carnage by which the sack was attended, Archimedes was slain. The accounts of his death are not entirely uniform, but the most commonly received version is, that being engaged in some mathematical investigations, either in his own study or in the market-place, he was so absorbed by his calculations, that not even the tumultuous shouts of the Romans, rushing in triumph through the walls, awakened him to a realizing sense that the city was at length captured. Under these circumstances, a Roman soldier suddenly approached him, and ordered him to follow him to Marcellus. "Disturb not my circle," exclaimed the old philosopher. "Hold off for a moment, till I have finished my problem." But the soldier, in a fury, having no respect either for him or his theorem, drew his sword, and laid him dead at his feet. Marcellus, it is said, had given orders that his life should be spared,—perhaps, that he might be seen marching behind his chariot wheels, among the captives, in the triumphal procession at Rome,—or, perhaps, it may have been, out of real regard for his scientific genius and celebrity. He is said, even, to have bestowed some favors upon the philosopher's relatives out of respect to his memory. But Dr. Arnold well observes, that "the Roman soldier's sword dealt kindly with Archimedes, in cutting short his scanty term of remaining life, and saving him from beholding the misery of his country."

Little now remains of the ancient city of Syracuse, once so celebrated for her wealth and luxury and learning and art,—which was able, at different periods of her history, to contend against the whole power of Athens,

of Carthage, and of Rome, and which, in its victory over the Athenian fleet, two hundred years before, had "settled the fate of the whole western world." Not even a table to write upon, or a chair to sit upon, could be conveniently found there by a most agreeable tourist in 1770. Of its vast ruins, once covering a space of thirty miles in circumference, but a few imperfect fragments can now be traced. Its celebrated fountain of Arethusa, associated, in the mind of the scholar, with so much of the rich romance of ancient poetry, has become turbid and muddy, and is only resorted to as a place for washing the clothes of the poor. But the name of that wonderful mathematician and mechanic will make the place of his birth and the scene of his experiments and his exploits memorable throughout all ages and all lands,—even when the tyranny of Dionysius and the patriotism of Timoleon shall have been alike forgotten. The ever-burning *Ætna* itself, in whose awful presence he lived, and whose mighty energies he seems to have emulated in that memorable siege, may sooner cease to roll up its volumes of smoke and flame to the skies, than the name of Archimedes,—now that it has been transplanted to another hemisphere, and taken in special charge by the mechanics of a new world,—shall cease to be remembered and cherished.

What might not such a man have accomplished, had he enjoyed this new hemisphere, with all its boundless opportunities and advantages, as his scene of action! You all remember his striking exclamation—"Give me a place to stand upon, and I will move the world!" That was the expression of a man, who felt that his sphere was too limited for his powers, and who panted for a wider field upon which to display his genius. If he ever spoke with contempt of the practical arts, it could only have been because he saw how little room for them there was in the narrow circuit to which his

life and labors were confined. It required a world-wide theatre for the great mechanical inventions which characterize our age. It needed ocean navigation—it needed the navigation of vast inland seas and of rivers thousands of miles long, to afford the stage and the stimulus for the experiments and the enterprise which led to the invention of steamboats. It needed the magnificent distances of modern intercommunication, and especially of our own American Union, to give full scope for the Railroad and the Telegraph. Above all, it needed a state of society and of government in which industry should no longer be the badge of servitude,—in which it should no longer be thought inconsistent with the dignity of a philosopher to busy himself with the common affairs and common interests of life, and in which the laboring millions should be lifted up—let me rather say, should *lift themselves up*, as they have done—to the assertion and enjoyment of the common and equal rights of humanity,—it needed all this to give occasion and inducement to those wonderful improvements and inventions of every sort, of which the chief benefit and blessing has been manifested in improving the condition, and multiplying so incalculably the comforts, of the great masses of mankind. Necessity is the mother of invention, and there was little or no necessity of that sort in Syracuse. But everything for which a demand existed, Archimedes seemed able to supply, and actually did supply.

It was not reserved for him to find a place for doing more. It was not his destiny to discover the fulcrum, by poising his mighty lever upon which, the world, as he knew it, could be moved. But sixteen hundred years afterwards, at the head of the very gulf on which Sicily stands, and within but a few days' sail of Syracuse, the man was born, to whom that lofty destiny was vouchsafed. Columbus, a native of Genoa, discovered the New World, and the Old World has been moving ever

since. And it is not too much to say, that this motion has been in great measure produced by those very mechanical discoveries and inventions of which Archimedes was the original designer, and by that application of science to art of which he furnished the first signal and successful example.

I may not prolong this discourse by dwelling upon that long series of discoverers and inventors and men of science and mechanics, in the old world or in the new, by whom the practical and useful arts have been advanced to their present state of perfection. Our own land has had its full share of them. Their names are known to you by heart. Some of them have lived, some of them are yet living, in our midst.

But there is time enough still left to me, I am sure, to allude briefly to at least one of them, long since dead,—who, if wide distinctions and differences in his condition and pursuits, forbid me from calling him the American Archimedes, may well be compared with that wonderful man in the services which he rendered to art, to science and to his country,—and whose memory, at this moment, has at least one thing in common with that of the great Syracusan, which, I trust, for the honor of his native country, and his native city, will not be of much longer continuance.

If any of you, my friends, as you happen to be passing down Hanover street, in this good city of Boston, on some pleasant morning, will pause for a moment on the side-walk of the First Baptist Church, and cast your eyes over to the right hand side of the street, you will perceive, suspended from a sort of crane, smaller, but perhaps not altogether unlike those which Archimedes thrust out from the walls of Syracuse to swamp the Roman ships, and projecting from the building which forms the upper corner of Hanover and Union streets,—a building in which may be found India rubbers on the lower story

and daguerreotypes up stairs, (two articles which were utterly unknown to commerce or to art in the days to which I am about to allude)—you will perceive, I say,—a wooden ball, about as large as a good-sized cocoa nut or a small-sized water melon ; and upon this ball, from which a part of the gilding has been already cracked and from which the rest seems rapidly peeling, you may discern without difficulty the date of 1698, legibly inscribed on both sides of it. How this precise date came there, it is not easy to tell ; at least I have never met with the explanation. But there is another inscription on the ball, and there are other well authenticated circumstances associated with it, which render it one of the most precious memorials,—which ought, certainly, to render it one of the most cherished relics,—of our city in the olden time.

There, in the year 1716, might have been seen a precocious and rather roguish boy, of about ten years of age, unwillingly but diligently employed in cutting wicks and filling moulds for the commoner sort of candles,—a humble occupation enough, but one not a little significant of the *light* which he was himself about to shed upon his country and upon mankind in after years. Born in Boston, on the 6th day of January, old style, or the 17th of January as we now call it, in the year 1706, in an old-fashioned gable-end house near the head of Milk street, opposite the Old South Church, in which he was christened the very same morning,—born in that well-remembered mansion, which, were it still standing, would be visited one of these days, if not now, with hardly less interest than that with which pilgrims from every land are found flocking to the humble birth-place of the great British bard at Stratford-upon-Avon,—the son of poor, but honest, industrious and pious parents, and having only been permitted to enjoy two years of schooling, one of them at the common grammar school of the town, and

the other at a private school for writing and arithmetic, the little fellow had been taken away thus early from his books and his play, to help along his father in his business,—which was that of a tallow-chandler and soap-boiler. And that father's name may still be decyphered beneath the torn and tarnished gilding on the ball to which I have alluded. Tradition tells us that it was originally a blue ball, and that it was at one time the sign of a public house.

At the sign of the blue ball, that boy remained assisting his father for two years, and there was every appearance that he was destined for a tallow-chandler himself. But there was that in his nature, which could not be content with the daily drudgery of this somewhat unsavory calling. There was that within him, which seemed to whisper in his youthful ear, as Archimedes declared aloud in his maturer manhood, that if he could only find a place to stand upon, *he*, too, could move the world. And this dissatisfaction with his condition, at length manifested itself so distinctly and in so many ways, that his father had good cause to apprehend, that if a more agreeable and congenial occupation were not soon provided for him, he would break loose from parental control and go off to sea, as one of his brothers had done before him.

And so, he was next destined by his well-meaning parents for a cutler's trade, and his wits were to be employed in making edge-tools for others, in order to prevent him from doing what young America, I believe, sometimes calls '*cutting stick*' himself. But fortunately, perhaps, for all concerned, the fee demanded for an apprenticeship in that craft was too considerable for his father's purse, and the cutler's trade was never entered upon.

An occupation, which in its incidental opportunities and advantages, at least, was better suited to his peculiar taste and talents, at last offered itself; and he may now be seen regularly indented and bound over as a printer's

apprentice till he should be twenty-one years of age, with what was doubtless deemed a most important and liberal stipulation in the covenant,—that for the last year of the term, he should be allowed journeyman's wages. No doubt he was the envy of all the young apprentices in his neighborhood, and considered as made for life, with such a rich remuneration in prospect. Under that indenture he remained steady and diligent for five years out of the nine which it covered,—working hard at the press during the day, and making the most of the leisure hours of the evening, and of the later hours of the night, too, in improving his handwriting, in practising composition, and in reading the books which accident brought within his reach,—and, fortunately for him and for us all, these were among the very best books which the world afforded—Plutarch, Bunyan, Defoe, and Addison.

But the yearning for a wider sphere could only be temporarily repressed by a condition like this, and indeed it was daily acquiring fresh impulse and increased energy from the very circumstances by which he was surrounded. The very last thing in the world for taming down a quick, earnest, inquiring and ambitious mind, conscious of its own power and its own superiority,—conscious, too, that its godlike capabilities were never meant to rust away unused,—the very last way in the world for reducing such a mind as this, into subjection to the discipline and drudgery of an indented apprenticeship, is to bring it into acquaintance and contact with that mighty mechanical engine, by which, more than by any other which has ever yet been known, either to ancient or to modern art, the old idea of Archimedes has been fulfilled and the world moved. If such a mind is to be kept under, let it busy itself with any other mystery beneath the sun, rather than with the mystery of the composing stick, more especially when it is employed in the service of a newspaper. There is an atmosphere in a printer's office,

which, some how or other, puts notions into boys' heads, and into men's heads, too,—an atmosphere which is very apt to make quick blood run quicker, and impulsive hearts beat higher, and active brains work harder, until those who were only indented to set up types for other people's thoughts, are suddenly found insisting on having other people to set up types for their own thoughts. So it has been, certainly, with more than one of your own most distinguished members, Mr. President,—your Russell, your Armstrong, and your Buckingham, the latter of whom has recently added a new claim to your regard, and to the regard of the community, by the preparation of an elaborate and excellent history of your Association.*

And so, certainly, it was with our young Boston printer's boy of 1718, whom not even journeyman's wages for the ninth year could tempt to serve out his time in mere type setting, and who even before the fifth year was fairly ended, availed himself of a tempting opportunity once more to assert his freedom, fled from his employer and family and native town, and who might have been seen, sometime in the year 1723, leaping ashore from on board of a little sloop at New York, a lad of only seventeen years old, without the least knowledge of any person in the place, and with very little money in his pocket. A few days afterwards he is found buying threepence worth of rolls out of a baker's shop in Philadelphia, and paying for them out of his last dollar, eating one of them himself from very hunger as he walked along Chestnut street, and washing it down with a draught of river water, giving the others to a poor woman and child whom he had met along the road, and at last finding his way into a Quaker meeting-house, and there falling asleep from utter fatigue and exhaustion;—a runaway apprentice,

* Annals of the Massachusetts Charitable Mechanic Association, by Joseph T. Buckingham, 1853.

who might have been seized under the fugitive act, if such an act had existed in those days!

Thus ended the career of BENJAMIN FRANKLIN in his native city of Boston, and almost at that very moment, almost at that early age, and under those unpropitious and seemingly desperate circumstances, he commenced a career of well-nigh unequalled usefulness to his fellow men, and of well-nigh unequalled service and glory to his country. I am not about to attempt any detailed sketch of that brilliant career in the little remnant of an hour's discourse. It is so identified with the history of his country and of the whole civilized world in the age in which he lived, that volumes have been, and might again be, filled, without exhausting either its interest or its variety. Mr. Sparks has performed a service to the community, in his edition of Franklin's writings, with a biography prefixed, second only to that which he has rendered in the preparation of his noble edition of the life and writings of Washington. And I am glad to perceive that one of our younger literary men, lately connected with the evening press of the city, (Mr. Epes Sargent,) has brought the life and writings of Franklin within the reach of every one, in a single volume, just published, containing almost everything that could be desired by an ordinary reader.

I have only alluded to that career, this evening, as presenting some striking circumstances, both of comparison and of contrast, with that of the great Syracusan philosopher and mechanic of antiquity, whose history I have just given you, and from a feeling which impressed itself upon my mind, on the first glance at the design of the diploma to which I have alluded, that the figure of Franklin resting on that old original printing-press of his, which is still to be seen in the patent office at Washington, might well have formed a counterpart to the figure of Archimedes resting on his screw. Their names are con-

nected with periods of history two thousand years apart, but they are still, and they will ever be, the names, which mechanics everywhere, and certainly in our own country, will remember and cherish, with an interest and a respect, which no other names in that long, long interval, can ever be permitted to share.

If Archimedes signalized his early ingenuity in discovering the defectiveness of King Hiero's crown, Franklin was second to no one in detecting and making manifest the defectiveness and worthlessness of all crowns, for any purposes of American free government.

If Archimedes by his burning mirrors drew down fire from the sun upon the foes of his country, Franklin caught the forked lightning upon his magic points, averted it from the homes of his fellow-men, and conducted it where it might be safely disarmed of its deadly properties.

And, certainly, if Archimedes exhibited a sublime spectacle, in setting at defiance and holding at bay the whole power of imperial Rome on sea and on land, by his marvelous and tremendous enginery, literally laughing a siege to scorn,—Franklin, sending up his kite and holding his key in a thunder storm, in order to draw deliberately down upon himself the flaming bolts of heaven, that he might analyze their character and verify his theory for the good of mankind, presents a picture of even greater and nobler sublimity.

Franklin did not, indeed, devote himself to profound mathematical and geometrical problems and theorems. He lived in a larger and busier world than Archimedes ever conceived of, and at a period when the distractions of an unsettled and uncivilized state of society permitted but little devotion or attention to philosophy or science of any sort. But he was not a whit behind the great Sicilian in the ingenuity and industry which he displayed, in devising and preparing the instruments and engines by which his countrymen were enabled to im-

prove their condition in time of peace, and to defend their soil and their independence in time of war. And I know not any one in our own history, or in any other history, who, from the variety and multiplicity of the improvements, inventions, and practical suggestions, both for the purposes of peace and of war, of which he was the author, could so well be likened to that hundred-handed Briareus, to whom Marcellus compared the old philosopher of Sicily, as Benjamin Franklin.

Nothing seemed too lofty, nothing too low, for his regard. But the great aim of his mind, unlike that of Archimedes, was undoubtedly that which Lord Mahou in one of his late volumes ascribes to it;—"whether in science and study, or in politics and action, the great aim of his mind was ever *practical utility*,"—and nothing could be juster or finer than the remark of Sir Humphrey Davy, that Franklin sought rather to make philosophy a useful inmate and servant in the common habitations of man, than to preserve her merely as an object of admiration in temples and palaces.

It is amazing, as we skim over the surface of his career ever so lightly, to contemplate the number and variety of his services to his fellow-men in all stations and conditions of life, and to reflect how many of our most valued institutions and establishments, for the welfare alike of the individual and of the state, were of his original suggestion and introduction.

See him, as early as 1731, setting on foot at Philadelphia, the first subscription library on this Continent, at a time when one of the great obstacles to improvement was the difficulty of access to books.

See him, the year after, commencing the publication of that earliest serial, *Poor Richard's Almanac*, which was to supply the place of so many other books for the spare minutes of the laboring poor, and filling it with maxims and proverbs which made it a fountain of wisdom for

every fireside where it found a place, as, indeed, it has remained to this day.

See him, in the city of his adoption, undertaking the improvement of the city watch, projecting the establishment of the first engine company for the extinguishment of fires, and soon after submitting a plan for paving, and cleaning, and lighting the streets.

Follow him a little further, and see him proposing and establishing the first philosophical society on our Continent, and afterwards laying the foundations of an institution for education, which ultimately grew up into the University of Pennsylvania.

See him inventing, at one moment, a fireplace, at the next, a lightning-rod, and at the next, a musical instrument making melody which his wife, at least, mistook for the music of angels.

Behold him, in the meantime, presiding with consummate ability and despatch over the Post Office department of the whole American Colonies,—an office which, considering the inadequacy of the means of communication within his command, must have required a hundredfold more of the hundred-handed faculty, than even now, when its duties and distances have been so incalculably multiplied.

See him, in time of war, too, or in anticipation of war, exhibiting the same marvelous facility and many-sided genius in providing for every exigency and emergency which the perils of his country might involve. The first of those volunteer militia companies, which are still among the best securities for law and order in our crowded cities, the very first of them, I believe, ever instituted on this Continent, were instituted under the auspices of Franklin, and he himself was the first colonel of the first volunteer regiment. The horses and waggons for the advance of General Braddock's army could never have been seasonably obtained, if ever obtained at all, but through his

ingenious and indomitable energy, and through the pledge of his own personal credit ;—and it is a most striking fact, that he warned that ill-starred commander (but warned him, alas! in vain) of the precise danger which awaited him ; that fatal ambuscade of the Indians, by which he and his forces were so disastrously cut off on the banks of the Monongahela, and from which our own Washington escaped only as by the miraculous interposition of an Almighty arm,—escaped so narrowly, and under circumstances so hopeless, to all human sight, that no one to this day, can read the story of that imminent peril and that hair-breadth 'scape, without a holding of the breath, and an involuntary shudder, at the idea of what might have been the consequences to our country, if Washington had thus early been lost to her.

Follow Franklin across the ocean. Witness that early and extraordinary examination which he underwent at the bar of the British House of Commons in 1766, when he fairly exhausted the whole subject of the commerce, the arts, the agriculture, the whole circumstances and condition of the infant Colonies, and of the views and feelings and resolute intentions of the colonists,—literally astonishing the world with the information and wisdom of his answers, and furnishing in the almost off-hand replies to off-hand questions, a history, which must be consulted to this hour, for the best understanding of the times.

Go with him to the bar of the Privy Council, a few years later, and mark his imperturbable patience and equanimity under the reproaches and revilings of the insolent Wedderburn, calling him a thief to his face. Go with him, a twelvemonth afterwards, to the bar of the House of Lords, and mark the same unmoved composure, when the peerless Chatham declares, in his own presence, that all Europe holds him in high estimation for his knowledge and wisdom, and ranks him with the Boyles and Newtons of old England.

Behold him at Court, the shrewd, sagacious and successful diplomatist, who, bringing his world-wide reputation as a philosopher, and his eminent character as a man, to the aid of his unequalled common sense and practical tact, did more than even Gates's army by their gallant and glorious victory at Saratoga, in bringing about that French Alliance and securing that French assistance, which finally turned the scale in favor of American Independence. Behold him signing that Treaty of Alliance and the Treaty of Amity and Commerce with France in 1778,—signing the provisional articles and the definitive Treaty of Independence and Peace with Great Britain in 1782 and 1783,—signing the Treaties of Amity and Commerce with Sweden and with Prussia in 1783 and 1785. Review the whole history of his successes as a minister, and his reception as a man, in so many foreign courts and by so many crowned heads, and then tell me if Solomon were not a prophet in regard to him, as well as in regard to Archimedes of old, in that memorable proverb, which Franklin himself tells us, in his admirable autobiography, that his father, among other instructions to him while a boy, so frequently repeated in his hearing ;—“ Seest thou a man diligent in his calling,—he shall stand before kings, he shall not stand before mean men ! ”

See him, finally, and above all, as early as 1754, as a delegate to the Convention at Albany, proposing that plan of Union among the Colonies, which was ultimately to become the mightiest engine which mortal wisdom ever invented for maintaining the freedom, prosperity and independence of a nation like ours. Franklin was undoubtedly the original proposer of the Union as we now enjoy it, and Mr. Bancroft has not hesitated to style him “ the true father of the American Union.”

His, indeed, was not the first plan of Union ever proposed on this Continent. The old primitive Union of the New England Colonies, more than a hundred years before,

instituted under the auspices of John Winthrop, then Governor of Massachusetts, and his associates, and of whose little Congress he was the first President,—*that* was the original pattern and model of a political machinery, which has proved more effective than any combination of pulleys and ropes and wheels which Archimedes ever devised or ever dreamed of, for rescuing and defending our country at once from domestic and from foreign foes, and for propelling our Great Republic onward—ever onward—in her mighty, matchless career.

But Franklin knew little of our early Colonial history. He may have known something about William Penn's plan of Union in 1697, but not enough even of that to impair his claim as an original proposer of Union in 1754. And thus it is, that the little Boston boy, who filled candle-moulds under the Blue Ball at the corner of Union Street, must have the credit of having first set the golden ball of Union in motion. And few men, if any man, did more than he did, to keep that ball rolling on and on, until the Declaration of Independence in '76 and the Constitution of the United States in '89,—of both of which he was one of the signers and one of the framers,—attested successively and unmistakably, that it was a ball and a Revolution, which could never go backwards, nor ever stop short of a full and perfect consummation.

When this great and glorious consummation was finally accomplished, Franklin was already older by many years than Archimedes was at the siege of Syracuse, and his work of life was finished. Happier than the great Sicilian philosopher, however, he fell by no hostile hand, and with no spectacle of his country's captivity and ruin before his eyes. He died, on the contrary, when he could not, in the course of nature, have expected or desired to live longer, at the age of 84, and in the confident assurance, which he expressed so characteristically while the Constitution of the United States was in pro-

cess of being signed, that the sun of his country's glory was a rising and not a setting sun, and was about to usher in a day—a long continued day—of prosperity and true progress, such as the sun in the heavens had never before shone upon.

Brave, benevolent, wonderful old man ! Well did our own Congress declare of him, in the resolutions adopted on his death, on motion of James Madison, that “his native genius was not more an ornament to human nature, than his various exertions of it have been precious, to science, to freedom, and to his country.” Well, too, was it said by that matchless French orator, Mirabeau, in announcing the event to the National Assembly of France, which went into mourning on the occasion, that “antiquity would have raised altars to this mighty genius, who, to the advantage of mankind, compassing in his mind the heavens and the earth, was able to restrain alike thunderbolts and tyrants.”

And if a eulogy of later date, long, long after the immediate impressions of his life and his loss had passed away, and when the time had arrived for a cool, deliberate and dispassionate judgment upon his abilities and his acts, his character and his whole career,—if such a eulogy be appealed to, as more worthy of reliance,—you may find it in the brief but glowing tribute to Franklin by Lord Brougham, in his late account of the statesmen of the times of George III., of which the opening paragraph will be more than enough for this occasion :

“One of the most remarkable men, certainly of our times, as a politician, (says he,) or of any age, as a philosopher, was Franklin ; who also stands alone in combining together these two characters, the greatest that man can sustain,—and in this, that having borne the first part in enlarging science by one of the greatest discoveries ever made, he bore the second part in founding one of the greatest empires of the world.”

Undoubtedly, my friends, it is often a perplexing and a perilous thing to attempt, as Lord Brougham has here done, to assign the precise rank upon the scale of merit and of fame, to which any of the great lights and leaders of the world may be entitled. Our own country, certainly, has never yet been so unfruitful of such productions, that individual men could be at all times seen overtopping the level of those around them, and could be singled out at a glance as surpassing all their cotemporaries in the varied elements which enter into a just and true idea of human greatness. The North and the South, Virginia and New England, Kentucky, South Carolina, New York, New Hampshire and Massachusetts, have more than once in our history been found vying with each other for the palm, as having produced the greatest statesman or the best man. It is a generous rivalry, and, in some respects, a wholesome one, and we would not desire to see it altogether extinguished. Our own little city of Boston, too, though she has often shone, and been proud to shine, with borrowed rays,—rays which she would have rejoiced to hold back still longer from their kindred skies,—has herself given birth to more than one luminary of no common brilliancy. That city need not be ashamed to compare calendars with any of its neighbors, which, to say nothing of the living, has given birth in a single generation to a Quincy, a Bowdoin, a Knox, and a Samuel Adams.

But no one, I think, can hesitate, for a moment, to admit, that while there are others who may be permitted to compete with Franklin for the title of the Great American,—a title, which I am sure would, everywhere and with one accord, be awarded, above all others and before all others, to the incomparable Washington,—that while others may be permitted to compete with Franklin for the title of the Great New Englander,—and I would not anticipate your judgment or the judgment of posterity

upon such a point,—that while others may even be permitted to compete with Franklin for the title of the Great Son of Massachusetts,—there is no one, not one, who has ever yet been numbered among the native children of our own metropolis, who can be allowed to dispute his claim, for an instant, to the proud designation of *the Great Bostonian*. And if in the lapse of centuries, and in the providence of God, Boston shall ever become as Syracuse now is, her temples and her palaces prostrated in the dust, her fountains a place for the poor to wash clothes at, and her harbor for the fishermen to dry nets in, I am by no means sure that she will have any more effective claim, or any more certain hold, upon the memory and the respect of a remote and world-wide posterity, than that which Syracuse now has,—that within her walls was born and cradled and brought up to manhood the great Patriot Philosopher and Mechanic of his age.

And now, my friends, if some one of the renowned orators or philosophers of the old world, if some British or European Cicero,—a Brougham or a Macaulay, a Humboldt or a Guizot,—on coming over to visit this proud and prosperous Republic of ours,—should happen, as well he might, to take a Halifax steamer and arrive first at the birth-place of Franklin,—and if, upon being waited on by the magistrates of the city, as Cicero of old was waited upon on his arrival at ancient Syracuse, with an offer to show him our Yankee lions,—if such a man, under such circumstances, instead of asking to be conducted to our temples of education or of religion, of charity or of liberty, to our Asylums or Athenæums, our aqueducts, our fountains, or our Faneuil Hall,—should inquire at once, as Cicero inquired, for the monument commemorative of the genius and services of one so known and honored throughout the world,—of him who wrested the sceptre from tyrants and the thunder-

bolt from the skies,—I think it would not be difficult to realize something of the embarrassment with which His Honor the Mayor, or whoever else might be his conductor, would suggest to the distinguished stranger, that though Franklin was born in Boston, he did not exactly die in Boston,—that there was, indeed, a little painted stone urn, without a name on it, in one of the side streets,—but that Philadelphia, perhaps, would be the more appropriate place to inquire at, as he was understood to have been buried there.

Our distinguished visitor, of course, would acquiesce in the suggestion; not, however, I imagine, without a shrug of astonishment, which French politeness might conceal, but which John Bull, in the person of my Lord Brougham, certainly, would be altogether likely to make quite as manifest as was agreeable. At any rate, he would postpone further inquiries until he reached Philadelphia, where he would rely on the satisfaction of paying his homage at the very grave of the great philosopher. And now let us imagine him to have reached the charming metropolis of Pennsylvania, and to have sallied out, as Cicero did, into the ancient grave-yards in quest of the tomb,—What, what, would he find there,—if, indeed, he succeeded in finding anything? Let me give you the description in the very words in which I have recently met with it, in one of the leading religious papers of our land:

“A dilapidated dark slab of stone, at the south-west corner of Fifth and Arch Streets, Philadelphia, marks (or did mark a few years ago) the spot where rest the remains of Benjamin and Deborah Franklin; but you cannot see their grave nor read the inscription without climbing a high brick wall, in violation of the law, or without securing a good opportunity and the favor of the sexton, each of which is said to be attended with difficulty. So well hidden is this grave, and so little

frequented, that we have known many native Philadelphians of men's and women's estate, who could not direct one to the locality where it may be found."

Is this, Mr. President, a mere parody of Cicero's description of his hunt for the tomb of Archimedes before the Christian era?—Or is it a genuine and authentic account of the tomb of Benjamin Franklin in this nineteenth century? If it be the latter, as, I am sorry to say, cannot be doubted,—said I not rightly and justly, a moment since, that there was at least one thing in common to the memory of the great Syracusan and the great Bostonian, which, I trusted, for the honor of us all, would not be of much longer continuance? Archimedes had been dead a hundred and thirty-six years, before Cicero discovered his forgotten tombstone buried up beneath briars and brambles. Less than half that time has elapsed since Franklin was summoned to the skies. He died only five years before this Association was founded, and, thanks to a kind Providence, not even all your original members are yet numbered among the dead. There is at least one of them,* I rejoice to remember, who may be seen almost every day on 'Change, with a heart as young as the youngest within these walls, and whose name, inscribed in the second volume of Webster's Speeches, as a token of the constant friendship and regard of their illustrious author, will be preserved as fresh and fragrant with future generations, as it is with that which has been the immediate witness of his genial good nature, his fullness of information, and his untiring obligingness. Sixty-three years only,—less, by seven, than the allotted term of a single human life, have thus expired since Franklin's death,—but they have been enough, it seems, to consign his tomb to dilapidation and almost to oblivion.

It is true, indeed, and in justice to Franklin himself, I

* Isaac P. Davis.

must not forget it or omit it, that with a native simplicity and modesty of character, which no compliments or caresses of the great or the learned, which no distinction or flattery at home or abroad, could ever corrupt or impair, this truly great man prescribed, by his own Will, the plainest and humblest possible memorial for his own resting-place.

“I wish (says he) to be buried by the side of my wife, if it may be, and that a marble stone, to be made by Chambers, six feet long and four feet wide, plain, with only a small moulding round the upper edge, and this inscription :

‘BENJAMIN AND DEBORAH FRANKLIN,
178—,’

to be placed over us both.”

It is true, also, that Franklin has left memorials enough of himself behind him, to render all further commemoration on his own account altogether superfluous.

Every lightning-rod is a monument to Franklin, of his own erection ; and not a flash, which is disarmed by its magic points, passes to the ground, without a fresh illumination of his title to the gratitude of mankind. One might almost be permitted to borrow the idea of the conscience-stricken king in Shakspeare’s *Tempest*, and to imagine the thunder, with its deep and dreadful diapason, pronouncing the name of *Franklin*,—not, indeed, as a name of terror, but as a pledge of safety in the storm.

Every penny-stamp, too, is a monument to Franklin, earned, if not established by himself, as the fruit of his early labors and his signal success in the organization of our infant post office ;—and no man, I think, can use the invaluable little implements of modern cheap postage,—I do not mean the stamped envelopes, which are nothing less than a disgrace to American art and a caricature of the Father of his country, but the original, separate

stamps,—without rejoicing that, apart from all other advantages of the system, the noble heads of Washington and Franklin are thus brought daily to our view, and are associated in the minds and hearts of the whole people of the Union, with the unspeakable privilege of a sure and speedy communication with the absent and the loved.

And here, in our own midst, too, I may add, every little silver medal distributed annually to the children of our free schools, is a precious memorial of Franklin; and every boy and girl who is incited by the prizes he instituted to higher efforts at distinction in good scholarship and good behavior, is a living monument to his prudent and provident consideration for the youth of his native city. One of the last things which a Boston boy ever forgets is, that he won and wore a Franklin medal. There is at least one of them, I know, who would not exchange the remembrance of that youthful distinction, for any honor which he has since enjoyed.

And though the larger provision which he made for the young and needy mechanics of our city has not quite realized all the advantages which he anticipated, yet the day is sure to arrive, when Boston and the whole Commonwealth will reap a rich harvest of public improvement from the surplus accumulation of the Franklin Mechanic Fund.

Not, then, because Franklin is in any danger of being forgotten,—not because his memory requires the aid of bronze or marble to rescue it from oblivion,—not because it is in the power of any of us to increase or extend his pervading and enduring fame,—but because, in these days of commemoration, it is unjust to ourselves, unjust to our own reputation for a discriminating estimate and a generous appreciation of real genius, of true greatness, and of devoted public service,—do I conclude this Lecture with the expression of an earnest hope, that the day may soon come, when it shall cease to be in the power

of any one to say, that the great Patriot Mechanic and Philosopher of modern times is without a statue or a monument, either in the city of his burial-place or his birth-place.

The mechanics of Massachusetts, the mechanics of New England, owe it to themselves to see to it, that this reproach no longer rests upon our community and our country. And I know not under what other auspices than theirs, such a work could be so fitly and so hopefully undertaken. When the obelisk at Bunker Hill,—doubly consecrated to us by the memory of those in whose honor it was erected, and of him whose consummate eloquence will be forever associated both with its corner-stone and its cap-stone,—when this noble monument was lingering in its slow ascent, the mechanics of Massachusetts pronounced the word, Let it be finished—and it was finished. And now there is another word for them to speak, and it will be done. Let them unite, let us all unite, with our brethren of Philadelphia and of the whole Union, in erecting a suitable monument near the grave of Franklin;—but let there not fail to be, also, a Statue of our own, on some appropriate spot of the Old Peninsula which gave him birth.

I know not of a greater encouragement which could be given to the cause of Science applied to Art, in which we are assembled; I know not of a greater encouragement which could be held out to the young apprentices, to whom we look to carry forward that cause in the future, and to supply the places of that noble race of Massachusetts mechanics to which our City, our State, and our whole Country, have been so greatly indebted, both for laying the foundations, and for building up the superstructure, not merely of our material edifices, but of our moral, civil and political institutions; I know not of a greater encouragement which could be afforded to industry, temperance, moderation, frugality, benevolence,

self-denial, self-devotion, and patriotism, in every art, occupation and condition of life,—than the visible presence, in some conspicuous quarter of our metropolis, of the venerable figure of Franklin, in that plain, old-fashioned, long-bodied, Quaker-like, coat, with which he will be forever associated in our minds, and in which he appeared proudly alike before kings and commoners ; and with that bland and benevolent countenance, which seems to say even to the humblest and least hopeful of God's creatures —“ I was once as you are now,—houseless and penniless, without fortune and without friends,—but never despair,—be just and fear not,—be sober, be diligent, be frugal, be faithful, love man and love God, and do your whole duty to yourself, to your neighbor, and to your country, in whatever circumstances you are placed,—and you, also, may do good in your day and generation,—and you, too, may, haply, leave a name, that shall be remembered and honored in all ages and throughout all climes !”

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